COMMENTS AND RESPONSE

In view of the comments below, Applicants respectfully requests that the Examiner reconsider the present application including rejected claims, as amended, and withdraw the claim rejections.

Specification

By this response the applicants have amended the specification to correct some minor clerical errors. No new matter is added by these amendments.

Drawings

The drawings are objected to under 37 CFR 1.83(a) for allegedly failing to show every feature of the invention specified in the claims. In particular, the "selector" recited in claim 9, the "calculator" and "comparator" recited in claim 15, the "subtractor" recited in claim 22, and the "detector" recited in claim 24 are alleged not to be shown.

Regarding the recited "selector," this feature is shown in the digital controller 110 of FIGs. 3 and 4D. The digital controller receives the output of the first and second arms, processes these signals, and uses the resultant data to ensure that the multiple correlation arms work together to ensure quality of service. This can include the function of selecting a detecting arm to identify the phase based on the correlation function

Regarding the recited "calculator," this feature is also shown in the digital controller 110 of FIGs. 3 and 4D. The digital controller receives the output of the first and second arms, processes these signals, and uses the resultant data to ensure that the multiple correlation arms work together

to ensure quality of service. This can include the function of finding a first correlation value for a first detecting arm that exceeds a predetermined threshold and a second correlation value for a second detecting arm that exceeds the predetermined threshold.

Regarding the recited "comparator," this feature is also shown in the digital controller 110 of FIGs. 3 and 4D. The digital controller receives the output of the first and second arms, processes these signals, and uses the resultant data to ensure that the multiple correlation arms work together to ensure quality of service. This can include the function of comparing the first correlation value to the second correlation value to select the detecting arm with a higher correlation value. In particular, Applicants' specification notes that "the data streams from the different arms must be correlated and aligned in synchronization coordinator 290." (See, e.g., specification, page 34, lines 9-11.)

Regarding the recited "subtractor," this feature is also shown in the digital controller 110 of FIGs. 3 and 4D. The digital controller receives the output of the first and second arms, processes these signals, and uses the resultant data to ensure that the multiple correlation arms work together to ensure quality of service. This can include the function of decreasing the predetermined threshold until the first correlation value is found.

Regarding the recited "detector," this feature is also shown in the digital controller 110 of FIGs. 3 and 4D. The digital controller receives the output of the first and second arms, processes these signals, and uses the resultant data to ensure that the multiple correlation arms work together to ensure quality of service. This can include the function of determining the first phase corresponding to the first correlation value.

As provided in 37 CFR 1.83(a), since a detailed illustration of these features is not essential for a proper understanding of the invention, they are illustrated in the drawing in the form of a

graphical drawing symbol or a labeled representation (i.e., a labeled rectangular box). Applicants assert that they are not required by 37 CFR 1.83(a) to provide any greater detail than what is shown in FIG. 4D.

Therefore, Applicants respectfully submit that the drawings do show every feature of the invention specified in the claims, and request that the Examiner withdraw this objection to the drawings.

Claim Rejections 35 USC § 103

The Examiner has rejected claims 1-6, 9-14, and 17 under 35 U.S.C. § 103(a) as being allegedly unpatentable over United States Patent No. 6,603,818 to Dress, Jr. et al. ("Dress"), in view of United States Patent No. 6,128,331 to Struhsaker et al. ("Struhsaker"). Applicants respectfully traverse this rejection. However, in an effort to expedite prosecution, Applicants have amended claims 1, 9, and 17 to better recite the present claimed invention.

Claim 1, as amended, recites generating first local pulses at a first detecting arm, generating second local pulses at a second detecting arm, and selecting one of the first and second detecting arms to identify the phase based on the correlation function and to demodulate data from the incoming UWB signal, and selecting another of the first and second detecting arms to vary its operational phase and continue to correlate first or second local pulses with the incoming pulses to refine the phase. Support for this amendment comes, for example, from FIGs. 2, 3, and 4D of Applicants' drawings and the related text in the specification.

From this claim language, it is clear that at least the recited first correlator is capable of demodulation. In contrast, neither Dress nor Struhsaker, alone or in combination teach or suggest this feature.

Dress notably fails to show separate arms that produce separate correlation functions, much less arms that demodulate. Struhsaker splits the function of the high precision correlation circuit 18 used to demodulate data from the function of the low precision correlation circuit 20 (See, e.g., Struhsaker, column 3, lines 8-60, and the Figure). Thus, none of the low precision correlators 28, which the Examiner asserts amount to the recited detecting arms, perform a data correlation function.

As a result, the applied references Dress or Struhsaker, alone or in combination, fail to teach or suggest the recited step of selecting one of the first and second detecting arms each of which are capable of identifying the phase based on the correlation function and to demodulate data from the incoming UWB signal. Since the applied art combination fails to teach or suggests the use of arms each with a demodulator, the step of selecting the first detecting arm to perform that function is necessarily not taught or suggested.

Furthermore, Struhsaker specifically separates the function of the low precision correlation circuit 20 from the demodulation performed in the high precision correlation circuit 18. The low precision nature of the correlator 28 allows for a significant reduction in circuit complexity and cost. (See, e.g., Struhsaker, column 4, lines 63-65.) Thus, it can be said that Struhsaker, and thus the applied art combination, teaches away from multiple arms, each containing a demodulator as claimed.

Claims 2-6 depend from claim 1 and are allowable for at least the reasons given above for claim 1.

Claim 9, as amended, recites a first correlator configured to correlate the incoming pulses with the first local pulses to produce a first correlation function, and configured to demodulate data from the incoming UWB signal, a second correlator configured to correlate the incoming pulses

with the second local pulses to produce a second correlation function, and configured to demodulate data from the incoming UWB signal, and a selector configured to select one of the first and second correlators to identify the phase based on the first and second correlation functions and to demodulate data from the incoming UWB signal, and to select another of the first and second correlators to perform a phase refining function. Support for this amendment comes, for example, from FIGs. 2, 3,and 4D of Applicants' drawings and the related text in the specification.

From this claim language, it is clear that both the recited first and second correlators are capable of demodulation. In contrast, neither Dress nor Struhsaker, alone or in combination teach or suggest this feature.

Dress as noted above, fails to show separate arms that produce separate correlation functions, and further fails to teach or suggest arms that demodulate. Struhsaker splits the function of the high precision correlation circuit 18 used to demodulate data from the function of the low precision correlation circuit 20. (See, e.g., Struhsaker, column 3, lines 8-60, and the Figure) Thus, none of the low precision correlators 28, which the Examiner asserts amounts to the recited correlators, perform a data correlation function.

As a result, the applied references Dress or Struhsaker, alone or in combination, fail to teach or suggests the recited correlators, nor does the applied art combination teach or suggest the recited selector, which is configured to select one of the first and second correlators to identify the phase based on the first and second correlation functions and to demodulate data from the incoming UWB signal. Since the applied art combination fail to teach or suggests the use of arms each with a demodulator, it necessarily fails to teach or suggests selecting an arm to perform that function.

Furthermore, Struhsaker specifically separates the function of the low precision correlation circuit 20 from the demodulation performed in the high precision correlation circuit 18. The low precision nature of the correlator 28 allows for a significant reduction in circuit complexity and cost. (See, e.g., Struhsaker, column 4, lines 63-65.) Thus, Struhsaker can be said to teach away from multiple arms, each containing a demodulator.

Claims 10-14 depend from claim 9 and are allowable for at least the reasons given above for claim 9.

Claim 17, as amended, recites means for correlating the first local pulses with the incoming pulses to produce a first correlation function, and for demodulating data from the incoming UWB signal, means for correlating the second local pulses with the incoming pulses to produce a second correlation function, and for demodulating the data from the incoming UWB signal, and means for selecting one of the first and second detecting arms to identify the phase and to demodulate the data from the incoming UWB signal based on the first and second correlation functions, and for selecting another of the first and second detecting arms to continue to produce either a first or second correlation function. Support for this amendment comes, for example, from FIGs. 2, 3, and 4D of Applicants' drawings and the related text in the specification.

From this claim language, it is clear that both the recited means for correlating the first local pulses, and the recited means for correlating the second local pulses are capable of demodulation. In contrast, neither Dress nor Struhsaker, alone or in combination teach or suggest this feature.

As previously noted, Dress fails to show separate arms that produce separate correlation functions, and further fails to show arms that demodulate. Struhsaker splits the function of the high precision correlation circuit 18 used to demodulate data from the function of the low precision

correlation circuit 20. (See, e.g., Struhsaker, column 3, lines 8-60, and the Figure) Thus, none of the low precision correlators 28, which the Examiner asserts amounts to the recited means for correlating, perform a data correlation function.

As a result, the applied references Dress or Struhsaker, alone or in combination, fail to teach or suggests the recited means for correlating, and further fails to teach or suggest the recited means for selecting, whose function is selecting one of the first and second detecting arms to identify the phase and to demodulate the data from the incoming UWB signal based on the first and second correlation functions. Since the applied art combination fails to teach or suggests the use of arms each with a demodulator, it necessarily fails to teach or suggests selecting an arm to perform that function.

Furthermore, Struhsaker specifically separates the function of the low precision correlation circuit 20 from the demodulation performed in the high precision correlation circuit 18. The low precision nature of the correlator 28 allows for a significant reduction in circuit complexity and cost. (See, e.g., Struhsaker, column 4, lines 63-65.) Thus, it can be said that Struhsaker teaches away from multiple arms, each containing a demodulator.

Therefore, based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 1-6, 9-14, and 17 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dress, in view of Struhsaker.

The Examiner has rejected claims 7, 15, 20, and 24 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dress, in view of Struhsaker, and further in view of United States Patent No. 5,768,306 to Sawahashi et al. ("Sawahashi").

Applicants have cancelled claim 7 herein without prejudice or disclaimer, rendering the rejection moot. It should be noted that since claim 7 is canceled to incorporate its features into claim 1, the subject matter of claim 7 should not be considered as surrendered.

Claim 20 depends from claim 1 and is allowable for at least the reasons given above for claim 1. Claims 15 and 24 depend from claim 9 and are allowable for at least the reasons given above for claim 9. Sawahashi fails to cure the deficiencies in Dress and Struhsaker noted above.

Therefore, based on at least the reasons given above, Applicants respectfully request that the rejection of claims 15, 20, and 24 be reconsidered and withdrawn.

The Examiner has rejected claims 8 and 16 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dress, in view of Struhsaker and Sawahashi, and further in view of United States Patent No. 6,493,360 to Nishimura ("Nishimura").

Claim 8 depends from claim 1 and is allowable for at least the reasons given above for claim 1. Claim 16 depends from claim 9 and is allowable for at least the reasons given above for claim 9. Nishimura or Sawahashi fails to cure the deficiencies in Dress and Struhsaker discussed above.

In addition, claims 8 and 16 are independently allowable in that they recite that the predetermined threshold is based on the desired bit error rate for the incoming UWB signal. Dress, Nishimura, Sawahashi, or Struhsaker, alone or in combination, fail to teach or suggests this feature.

In particular, Nishimura describes that a memory stores two or more threshold values for a movement average, and that after the two or more threshold values and the movement average are compared with each other, a correlation is taken by a UW correlation judgment circuit when the movement average is larger than the minimum values of the two or more threshold values. (See,

e.g., Nishimura, abstract, lines 7-13.) However, Nishimura fails to teach or suggests that these thresholds are based on the desired bit error rates for an incoming signal. It is not sufficient for the bit error rates to be lower when a given threshold is met. Claims 8 and 16 require that the threshold *is based on* a desired bit error rate of the incoming UWB signal. No such relationship is taught or suggested in Nishimura.

Furthermore, Nishimura describes thresholds that are compared to movement averages (relating to the power level of the received signal), not to a correlation result. As a result, Applicants assert that there would not be a proper motivation to combine the teachings of Nishimura with those of Dress, Struhsaker, and Sawahashi, as suggested by the Examiner.

The lack of motivation is particularly relevant given the number of documents that the Examiner is proposing to combine. It is well established that the Examiner cannot pick and choose insular teachings from a large number of independent documents using the Applicants' application as a blueprint for the combination. Such piecemeal application amounts to classic impermissible hindsight. Rather, the must show a specific motivation or suggestion provided in the references themselves for the combination beyond a simple assertion that it would have been obvious to combine them.

The fact that a movement average result is compared to a threshold value does not provide a teaching to compare a correlation result to a threshold value. Even if, *arguendo*, Nishimura did teach that a threshold value relating to a movement average were set based on a desired bit error rate, such a teaching would still fail to provide a proper motivation to set a threshold value relating to a correlation result based on a desired bit error rate. Nishimura fails to provide any suggestion or motivation to modify a correlator circuit, thus it would be improper to combine its teachings with teachings related to correlation circuits.

Therefore, based on at least the reasons given above, Applicants respectfully request that the rejection of claims 8 and 16 be reconsidered and withdrawn..

The Examiner has rejected claims 18, 19, 22, and 23 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dress, in view of Struhsaker, and further in view of Nishimura.

Applicants have amended claim 18 into independent form, including all of the limitations of claim 1, from which it depended., and have also amended claim 22 into independent form, including all of the limitations of claim 9, from which it depended.

Claim 18 recites decreasing the predetermined threshold until the first correlation value is found, and claim 22 recites a subtractor configured to decrease the predetermined threshold until the first correlation value is found. The applied references Dress, Struhsaker, or Nishimura, alone or in combination, fail to teach or suggests the claimed features.

Nishimura describes that when a movement average is smaller than a minimum threshold value, the minimum threshold value is decreased (See, e.g., Nishimura, column 11, lines 38-40.) Such a description however fails to teach or suggest altering a threshold used for a correlation result. The alteration of a threshold for a measurement of received power does not provide any suggestion to alter a threshold used to determine the applicability of a correlation result. The claimed correlation result determines a degree of, for example, phase correlation between two signals and is not concerned with total received power, thus the criteria used in setting thresholds in the claimed invention can be distinguished from the thresholds described the applied art combination.

Claims 19 and 23 further recite that the predetermined threshold is based on the desired bit error rate for the incoming UWB signal. The applied references Dress, Struhsaker, or Nishimura,

alone or in combination, fail to teach or suggests this feature, for at least the reasons given above for claims 8 and 16.

Furthermore, Nishimura describes thresholds that are compared to movement averages (relating to the power level of the received signal), not to correlation results. As a result, Applicants assert that there would not be a proper motivation to combine the teachings of Nishimura with those of Dress and Struhsaker, as suggested by the Examiner. As noted above, comparing a movement average result to a threshold value does not provide a teaching to compare a correlation result to a threshold value. Similarly, any parameters relating to the alteration of thresholds related to movement averages/power levels would be inapplicable to adjusting thresholds for correlation results. Even if, *arguendo,* Nishimura did teach that a threshold value relating to a movement average were set based on a desired bit error rate, such a teaching would still not provide a proper motivation to set a threshold value relating to a correlation result based on a desired bit error rate. Nothing in Nishimura provides any suggestion or motivation to modify a correlator circuit, and it would be improper to combine its teachings with teachings related to correlation circuits.

Therefore, based on at least the reasons given above, Applicants respectfully request that the rejection of claims 18, 19, 22, and 23 be reconsidered and withdrawn.

The Examiner has rejected claims 21 and 25 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dress, in view of Struhsaker, and further in view of Nishimura.

Claim 21 depends from claim 20 and is allowable for at least the same reasons given above for claim 20.

Claim 25 recites that the predetermined threshold is based on a desired bit error rate of the incoming UWB signal. The applied references Dress, Struhsaker, or Nishimura, alone or in

combination, fail to teach or suggest this feature, for at least the reasons given above for claims 8, 16, 19, and 23.

Therefore, based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claim 21 and 25 as being allegedly unpatentable over Dress, in view of Struhsaker, and further in view of Nishimura.

New Claims

By this response, Applicants have added new claims 26-30. Support for these claims can be found, for example, in FIGs. 2, 3, and 4D of Applicants' drawings and the related text in the specification. Favorable consideration is respectfully requested.

Conclusion

Accordingly, Applicants respectfully submit that the claims, as amended, clearly and patentably distinguish over the cited references of record and as such are deemed allowable. Such allowance is hereby earnestly and respectfully solicited at an early date. If the Examiner has any suggestions, comments, or questions, calls are welcome at the telephone number below.

Although it is not anticipated that any additional fees are due or payable, the Commissioner is hereby authorized to charge any fees that may be required to Deposit Account No. **50-1147**.

Respectfully Submitted,

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